

# Effectiveness of Participatory Teaching Methods in the Standardized Training of Respiratory Medicine Residents

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**Abstract:** *Objective:* To explore and analyze the application effect of participatory teaching method in the standardized training of respiratory medicine residents. *Methods:* The study period was from May 2022 to May 2023. 20 doctors in the standardized training of respiratory medicine residency in our hospital were taken as research subjects and grouped into the participatory group (n = 10) and the routine group (n = 10) by using the random number lottery method. The participatory group practised participatory teaching methods, and the routine group practised routine teaching methods. The results of discharge assessment, teaching evaluation, and mini-Clinical Evaluation Exercise (mini-CEX) assessment were compared between the groups. *Results:* The theoretical assessment, operational assessment, and total scores of the participatory group were significantly higher than those of the routine group, and the difference was statistically significant ( $P < 0.05$ ). The teaching evaluation of independent learning, theoretical mastery, teamwork, clinical thinking, communication, and learning interest of the participatory group was significantly higher than that of the routine group, and the difference was statistically significant ( $P < 0.05$ ). The mini-CEX assessments of history inquiry, organizational effectiveness, professionalism, physical examination, clinical diagnosis, communication skills, and overall clinical competence of the participatory group were significantly better than those of the routine group, and the difference was statistically significant ( $P < 0.05$ ). The teaching satisfaction of the participatory group was significantly higher than that of the routine group, the difference was statistically significant ( $P < 0.05$ ). *Conclusion:* Participatory teaching methods can improve the overall level of doctors in the respiratory medicine residency standardized training, and the teaching satisfaction is improved.

**Keywords:** Participatory teaching method; Respiratory medicine; Residency; Standardized training

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## 1. Introduction

Residency standardized training is a system carried out for medical students to cultivate high-level doctors for the purpose of comprehensively improving clinical level, increasing the integration of theory and practice, and comprehensively cultivating medical talents<sup>[1,2]</sup>. Internal medicine is a very critical medical discipline, and respiratory medicine is a department for respiratory internal medicine treatment. Its teaching mode is

relatively traditional, and the training doctors have very few practice opportunities, thus affecting their clinical work ability and professional level<sup>[3,4]</sup>. Based on this, the teaching mode of standardized residency training is reformed<sup>[5]</sup>. Participatory teaching method is a new type of teaching mode, which allows doctors in training to participate in teaching, and discuss and learn together with teachers. The purpose of this paper is to study and analyze the application effect of participatory teaching method in the standardized training of respiratory medicine residents.

## 2. General information and methods

### 2.1. General information

The study period was from May 2022 to May 2023. 20 doctors in the standardized training of respiratory medicine residency in our hospital were taken as the study subjects and grouped into the participatory group ( $n = 10$ ) and the routine group ( $n = 10$ ) using the random number lottery method. There were 7 males and 3 females in the participatory group; their ages ranged from 23–28 years, with a mean age of  $25.05 \pm 1.54$  years. In the routine group, there were 8 males and 2 females, with an age range of 24–28 years and mean age of  $25.16 \pm 1.49$  years. Comparing the general information such as gender and age between the groups, the difference was not statistically significant ( $P > 0.05$ ).

### 2.2. Methods

The routine group was taught using the conventional teaching method: doctors in training were assigned specialized teaching teachers, who were responsible for demonstrating clinical operations and reviewing theoretical knowledge for the students.

The participatory group practised participatory teaching methods:

- (1) Teachers learned participatory teaching methods, clarified the teaching objectives according to the clinical characteristics of respiratory medicine and the types of diseases, and formulated a detailed and perfect teaching plan.
- (2) Before the start of the teaching, the teacher introduced the concept of participatory teaching and its characteristics to the trainers, and showed the teaching plan and teaching objectives, so that the trainers had a certain understanding of this teaching method.
- (3) The doctors-in-training were divided into 2 groups of 5 people each, and before the chapter courses were taught, the members of each group were asked to search for information, retrieve the literature, and develop the courseware, which was then sent to the teacher, who was required to review and correct the courseware.
- (4) In the classroom, each group elected a doctor-in-training to participate in the defense. In the defense process, the teacher asked questions first, and subsequently the students asked questions. After the defense, the teacher reviewed and summarized the defense, and added to the knowledge.
- (5) In case analysis, the teacher chose a typical case, allowed the group to analyze the case among themselves, and made an analysis report from the analysis process, so that the trainer doctors can discover and solve the problems independently. At the end of the case analysis, the teacher accepted the case analysis, explained and guided the incorrect analysis, and added and explained the characteristics of the case.
- (6) In role-playing, doctors were trained to freely choose the cases, and group members played the relevant roles of the case, including patients, doctors, family members, etc., from the patient's visit to the consultation to the diagnosis and treatment plan, the whole process was simulated. Depending

on the type of case, clinical operations such as cardiopulmonary resuscitation, pleura puncture, blood gas analysis, tracheal intubation, and mechanical ventilation were randomly examined. Teachers were responsible for recording the errors in the clinical operations of the training doctors and giving comments after the performance.

- (7) The training doctors asked the teachers about the problems arising in the learning process, the teachers first analyzed the causes of the problems raised by the students, and patiently analyzed and solved the problems for the students.

### 2.3. Observation indicators

The indicators below were observed and compared between the groups.

- (1) The discharge assessment scores were compared between groups, including theory assessment, operation assessment, and the total scores.
- (2) The teaching evaluation was compared between groups, including independent learning, theoretical mastery, teamwork, clinical thinking, communication, and learning interest (0–5 point).
- (3) The mini-CEX assessment was compared between groups, including history inquiry, organizational effectiveness, professionalism, physical examination, clinical diagnosis, communication skills, and overall clinical competence (0–9 points).
- (4) The teaching satisfaction was compared between groups, assessed by a homemade teaching satisfaction scale, including very satisfied, fairly satisfied, and unsatisfied.

### 2.4. Statistical analysis

SPSS21.0 statistical software was selected to process and analyze the data, and the counting data were expressed by the number of cases (n) and percentage (%), and the  $\chi^2$  test was implemented, and the measuring data were expressed by the mean  $\pm$  standard deviation (SD), and the *t* test was implemented, and the difference was statistically significant at  $P < 0.05$ .

## 3. Results

### 3.1. Comparison of discharge examination results between the participatory group and the routine group

The theory examination, operation examination, and total scores of the participatory group were significantly higher than those of the routine group, the difference was statistically significant ( $P < 0.05$ ). The results are shown in **Table 1**.

**Table 1.** Comparison of discharge assessment scores between the groups (mean  $\pm$  SD, in points)

Group	Number of cases	Theoretical assessment	Operational assessment	Total scores
Participatory group	10	94.24 $\pm$ 4.52	90.41 $\pm$ 5.61	184.65 $\pm$ 10.13
Routine group	10	80.44 $\pm$ 6.52	78.24 $\pm$ 5.91	158.68 $\pm$ 12.43
<i>t</i> value	-	5.5006	4.7228	5.1215
<i>P</i> value	-	0.0000	0.0002	0.0001

### 3.2. Comparison of the teaching evaluation of the participatory group and the routine group

The teaching evaluation of independent learning, theoretical mastery, teamwork, clinical thinking, communication, learning interest, and other teaching evaluations of the participatory group were significantly higher than those of the routine group, the difference was statistically significant ( $P < 0.05$ ), as shown in **Table 2**.

**Table 2.** Comparison of teaching evaluations between the groups (mean  $\pm$  SD, in points)

Group	Number of cases	Independent learning	Theoretical mastery	Teamwork	Clinical thinking	Communication	Learning interest
Participatory group	10	4.28 $\pm$ 0.32	4.25 $\pm$ 0.31	4.29 $\pm$ 0.29	4.35 $\pm$ 0.51	4.27 $\pm$ 0.56	4.18 $\pm$ 0.54
Routine group	10	3.85 $\pm$ 0.25	2.85 $\pm$ 0.41	3.45 $\pm$ 0.26	3.76 $\pm$ 0.46	3.74 $\pm$ 0.51	3.75 $\pm$ 0.42
<i>t</i> value	-	3.3485	8.6131	6.8200	2.7165	2.2127	6.6101
<i>P</i> value	-	0.0036	0.0000	0.0000	0.0141	0.0401	0.0000

### 3.3. Comparison of mini-CEX assessment between the participatory group and the routine group

The mini-CEX assessment of history inquiry, organizational effectiveness, professionalism, physical examination, clinical diagnosis, communication skills, and overall clinical competence of the participatory group was significantly better than that of the routine group, and the difference was statistically significant ( $P < 0.05$ ). The results are presented in **Table 3**.

**Table 3.** Comparison of mini-CEX assessment between the groups (mean  $\pm$  SD, in points)

Group	Number of cases	Medical history inquiries	Organizational energy efficiency	Professionalism	Physical examination	Clinical diagnosis	Communication skills	Overall clinical competence
Participatory group	10	7.84 $\pm$ 0.25	7.38 $\pm$ 0.16	7.76 $\pm$ 0.24	7.29 $\pm$ 0.31	7.34 $\pm$ 0.42	7.22 $\pm$ 0.18	7.78 $\pm$ 0.19
Routine group	10	6.14 $\pm$ 0.19	6.34 $\pm$ 0.25	6.75 $\pm$ 0.26	6.57 $\pm$ 0.27	6.75 $\pm$ 0.32	6.68 $\pm$ 0.52	6.89 $\pm$ 0.42
<i>t</i> value	-	17.1202	11.0801	9.0264	5.5384	3.5335	3.1032	6.1053
<i>P</i> value	-	0.0000	0.0000	0.0000	0.0000	0.0024	0.0061	0.0000

### 3.4. Comparison of teaching satisfaction between the participatory group and the routine group

The teaching satisfaction of the participatory group was significantly higher than that of the routine group, the difference was statistically significant ( $P < 0.05$ ), as presented in **Table 4**.

**Table 4.** Comparison of teaching satisfaction between the groups [n (%)]

Group	Number of cases	Very satisfied	Fairly satisfied	Unsatisfied	Total satisfaction
Participatory group	10	7 (70.00)	3 (30.00)	0 (0.00)	10 (100.00)
Routine group	10	4 (40.00)	2 (20.00)	4 (40.00)	6 (60.00)
$\chi^2$ value	-	-	-	-	5.0000
<i>P</i> value	-	-	-	-	0.0253

## 4. Discussion

Medicine is a discipline that treats diseases and helps patients to restore their health, which is an essential

specialty in society. The discipline requires lifelong learning, which not only includes a large amount of theoretical knowledge, but also the mastery of clinical operations to achieve the integration of theory and practical operation in order to become a qualified doctor [6,7]. The purpose of standardized training of residents is to cultivate professional clinical technical talents, most of the teaching in the clinic adopts the traditional teaching method, and the teacher is the leading role in teaching, in which the teaching is carried out with hands-on demonstration combined with theoretical lectures, and the training doctors play a passive role leading to unsatisfactory teaching effect [8,9]. In recent years, changes have been made in teaching methods to improve the comprehensive ability of training doctors [10]. The participatory teaching method is a popular teaching method in recent years, which adopts a scientific and democratic teaching mode to provide practice opportunities for doctors-in-training and create active space, so that doctors-in-training can act as the main body and the teacher as the auxiliary [11]. This teaching mode abandons fill-in teaching and utilizes cooperative and discussion teaching to create a positive learning atmosphere [12]. During the teaching process, every doctor-in-training is allowed to participate in it, and they can freely express their opinions, which stimulates personal potential and comprehensively improves the personal strength of doctors-in-training [13]. Role-playing allows doctors-in-training to enter the clinic, combining theory and practice, and realizing technical transformation [14,15].

The results of the experiment are as follows: the theory test, operation test, and total scores of the participatory group were significantly higher than that of the routine group, the difference is statistically significant ( $P < 0.05$ ). Teaching evaluations of independent learning, theoretical mastery, teamwork, clinical thinking, communication, and learning interest of the participatory group were significantly higher than those of the routine group, the difference was statistically significant ( $P < 0.05$ ). The mini-CEX assessments of history inquiry, organizational effectiveness, professionalism, physical examination, clinical diagnosis, communication skills, and overall clinical competence of the participatory group were significantly better than those of the routine group, and the difference was statistically significant ( $P < 0.05$ ). The teaching satisfaction of the participatory group was significantly higher than that of the routine group, the difference was statistically significant ( $P < 0.05$ ). With the implementation of the participatory teaching method, the discharge examination results of the trained doctors were very satisfactory, the learning effect evaluation was high, and the comprehensive clinical ability was significantly improved.

## 5. Conclusion

In summary, the application of participatory teaching methods in the standardized training of respiratory medicine residents improves the quality of doctors' learning and strengthens their ability to master the knowledge.

## Disclosure statement

The authors declare no conflict of interest.

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